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PATENT SPECIFICATION

Convention Date (United States): April 12, 1935.

476,655

Application Date (in United Kingdom): March 5, 1936. No. 6631/36.

Specification not Accepted



COMPLETE SPECIFICATION

Copper Alloys

I, MICHAEL GEORGE CORSON, a Citizen of the United States of America, of 145, East 23rd Street, New York City, State of New York, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

10 The invention relates to a copper base alloy, and an object of the invention is to provide a new and improved material suitable for use as conductive parts of electrical equipment.

15 Pure copper has a relatively high electrical conductivity, but for many purposes it is deficient in strength and hardness, and is difficult to cast properly. According to the present invention, there

20 is provided a copper base alloy having an electrical conductivity upwards of about 30% that of pure copper and containing about 0.2% to 1% chromium which imparts to the alloy the property of

25 hardenability by heat treatment and at least 0.35% but less than 1% aluminum which increases the surface tension and oxidation resistance of the alloy when molten, the remainder of the alloy being

30 chiefly copper. The resulting product is highly resistant to oxidation during foundry operations, and when molten has a high surface tension which prevents adhesion of the alloy to the sand or metal

35 at the face of the mold. These properties permit the production of castings the surfaces of which require little or no machining, grinding, or filing. The product is further characterized by relatively great hardness: about 80 to 85 Brinell (500 Kg. load) in the as-cast state or when air-cooled from hot working temperatures, and about 110 Brinell when heat treated to produce increased precipitation hardness; and great tensile strength: about 35000 to 55000 pounds per square inch, depending upon the heat treatment employed. Another valuable

property of the alloy is its relatively high electrical conductivity which is, for example, over 30% of the copper standard when the alloy is in the as-cast condition. Such a high conductivity cannot be attained in any known cast copper alloy having similar strength and hardness without heat treatment. The electrical conductivity is substantially decreased if the proportion of aluminum is increased beyond the limit specified.

The content of chromium is preferably at least 0.35% of the alloy. Tin or zinc, or both, in amounts up to a total of about 5%, may be added without departing from the invention.

A suitable heat treatment which improves strength and conductivity of the alloy comprises quenching it from about 700° to 900° C. and subsequently re-heating it at about 400° C. to 550° C. for about 12 hours to 3 hours, the lower re-heating temperature requiring the longer treatments.

Although the invention may usefully be embodied in many articles of manufacture, a preferred embodiment is a cast electrical conductor characterized by a novel combination of high strength and high conductivity.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Copper base alloy having an electrical conductivity upwards of about 30% that of pure copper and containing about 0.2% to 1% chromium which imparts to the alloy the property of hardenability by heat treatment and at least 0.35% but less than 1% aluminum which increases the surface tension and oxidation resistance of the alloy when molten, the remainder of the alloy being chiefly copper.

2. Copper base alloy as claimed in claim 1, wherein the chromium content is

about 0.35% to 1%.

3. Hardenable cast electrical conductor composed of an alloy as claimed in claim 1 or 2.

5 4. Copper base alloys substantially as described.

Dated this 4th day of March, 1936.
W. P. THOMPSON & CO.,
12, Church Street, Liverpool 1,
Chartered Patent Agents.

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